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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,806	03/23/2004	Clement J. Fortin	END920020027US2	2910
7590 03/30/2006			EXAMINER	
John A. Jordan, Esq. 11 Hyspot Road Greenfield Center, NY 12833			DOLAN, JENNIFER M	
			ART UNIT	PAPER NUMBER
			2813	

DATE MAILED: 03/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/806,806	Applicant(s) FORTIN ET AL.	
	Examiner Jennifer M. Dolan	Art Unit 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21 and 25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 25 is/are allowed.
- 6) ☒ Claim(s) 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 19 December 2005 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 21 is rejected under 35 U.S.C. 103(a) as unpatentable over U.S. Patent No. 6,521,997 to Huang et al. in view of U.S. Patent No. 6,303,872 to Jairazbhoy et al.

Huang discloses a package comprising: a substrate (1' – see figure 4) having at least two electrical contact pads (12') thereon; and a passive SMD (15') having at least two electrical contacts (150,151; see figures 3-4), each contact having a lower surface (bottom surface of contacts facing the contact pads; see figures 3 and 4) and an upper surface (top surface of the contacts 150, 151) at the terminus thereof, with at least the lower contact surface positioned toward the two contact pads of the substrate (see figures 3-4) and with the lower and side

surfaces bonded by a solder connection to the contact pads (see figures 3-4; see column 3, lines 30-35), the passive SMD encapsulated by a resin (16'; see figure 4) such that the space between the passive SMD and the substrate is filled with the resin, with the resin further forming fillets around each passive SMD solder connection including the upper contact surface (see figure 4; column 4, lines 3-27, noting that the resin on the lateral surface of the SMD is structurally substantially similar to the claimed fillets).

Huang fails to teach that the solder connection is present on the upper contact surface.

Jairazbhoy discloses that an optimal solder joint for a two terminal passive device includes solder on the top surface of the lateral contact (see figure 3).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the SMD packaging structure of Huang, such that the solder from the lateral solder joint is present on the upper contact surface, as taught by Jairazbhoy. The rationale is as follows: A person having ordinary skill in the art would have been motivated to dispose solder on the upper contact surface, because Jairazbhoy shows that doing so balances the net forces applied on the SMD during solder reflow, such that the SMD remains properly aligned with the substrate and such that the solder joint has optimal structural integrity (see Jairazbhoy, column 1, lines 20-50; column 2, lines 10-20 and 53-65).

Allowable Subject Matter

4. Claim 25 is allowed.
5. The following is an examiner's statement of reasons for allowance:

The primary reason for allowance is the combination of using a passive SMD having solder connecting a lower contact surface to a substrate and present upon an upper contact surface, using an epoxy resin underfill including a fluxing agent, and having the resin form fillets around the passive SMD solder connection including over the upper contact surface.

The prior art applied against claim 21 (Huang and Jairazbhoy) teaches all of the limitations of claim 25, except the limitation that the resin is an epoxy based flux encapsulant. It is well known in the prior art to include fluxing agents in no-flow underfill epoxy resins (see US 2003/0171456 to Tong et al. or US 2003/0080437 to Gonzalez et al.), where the resin is present and surrounds the solder joints prior to solder reflow. The Examiner notes that the prior art does not teach that a fluxing agent would be present in an underfill or encapsulant dispensed after chip attachment/solder reflow.

Normally, the examiner would consider the substitution of a no-flow underfill for a deposited underfill to be obvious to a person having ordinary skill in the art, based on the well-known advantages of no-flow underfills, such as cheaper and faster manufacture as well as ability to produce void-free, and hence more reliable underfills. In the present case, however, since the fillet formation in Huang et al. specifically relies upon dispensing the encapsulant 16' under and around the chip after chip attachment, it is unclear as to how the lateral fillets could be formed in Huang if a no-flow resin is applied, rather than the dispensed resin of Huang. Therefore, it is the Examiner's opinion that a person having ordinary skill in the art would either find no motivation for using a no-flow encapsulant for forming fillets around the solder connections, or any combination of Huang-type references including the fillets and the no-flow resin would result in an absence of fillets in the final structure.

Since the Applicant illustrates in the disclosure of the present invention that formation of fillets around the lateral solder joints of an SMD using a no-flow underfill is not a trivial process (see specification, page 6, lines 9-20; page 8, lines 6-20; page 9, lines 5-25), and since the prior art provides no teachings of the fillets around the SMD with the claimed geometry using a no-flow (flux containing) underfill, it is the Examiner's opinion that the invention as claimed would not have been obvious to a person having ordinary skill in the art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

6. Applicant's arguments with respect to claims 21 and 25 have been considered but are moot in view of the new grounds of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Dolan whose telephone number is (571) 272-1690. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

Application/Control Number: 10/806,806
Art Unit: 2813


Page 6

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer M. Dolan
Examiner
Art Unit 2813

jmd


CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800